REMARKS

In response to the Official Action mailed on April 1, 2008, the application has been amended. No new matter has been added. Reconsideration of the rejections of the claims is respectfully requested in view of the above amendments and the following remarks.

On page 2 of the Official Action, claims 8 and 10 - 15 were rejected under 35 USC 102(b) as anticipated by Kawaguchi et al (U.S. Patent No. 4,568,592, referred to below as Kawaguchi). This rejection is respectfully traversed.

Claim 8 describes a method of interconnecting terminals including heating a resin composition to a temperature higher than the melting point of electrically conductive particles in the resin composition. Similarly, claim 11 describes a method of mounting a semiconductor device including heating a resin composition to a temperature higher than the melting point of electrically conductive particles in the resin composition. Kawaguchi does not disclose such a method.

Kawaguchi discloses an anisotropically electroconductive film adhesive 1 which can be used to connect circuit boards 2a and 2b. The adhesive 1 includes a thermally adhesive polymeric material 3 and conductive fibrils 4 dispersed in the matrix of the polymeric material 3. When heat and pressure are applied, the polymeric material 3 is softened and squeezed out of the initial space between the circuit boards, and the pressure forces

the fibrils 4 into contact with each to form an aggregate. The polymeric material is then cooled while the application of pressure is maintained, and the cured polymeric material adhesively bonds the circuit boards to each other.

It can be seen that the process which is set forth in Kawaguchi is clearly different from that recited in claims 8 and 11 because Kawaguchi does not include any melting of electrically conductive particles, since Kawaguchi heats the polymeric material 3 to a temperature which is far below the melting point of the conductive fibrils.

This fact is clear from the examples of Kawaguchi. For example, in Example 1 of Kawaguchi, a film adhesive for joining printed circuit boards comprises brass fibrils dispersed in an epoxy resin. The film is sandwiched between two circuit boards, and heating is performed at 170°C to bond the circuit boards to each other. Brass is a zinc-copper alloy having a zinc content which generally ranges from a low value of 15% (giving a melting point for brass of over 1000°C) to a high value of 40% (giving a melting point for brass of approximately 900°C). Given that the film in Example 1 is only heated to 170°C, the brass fibrils are clearly not heated to above their melting temperature.

In Example 2 of Kawaguchi, a film adhesive for joining printed circuit boards is formed by carbon fibrils dispersed in a polyolefin resin. The film adhesive is disposed between two circuit boards and heated under pressure at 110°C. In Example 3, a film adhesive for joining printed circuit boards comprises carbon fibers dispersed in rubber. This film adhesive is used to

join two flexible circuit boards to each other by heating under pressure at 150°C. The Applicants have not been able to readily find a reference which states the melting point of carbon fibrils, but the attached pages on carbon fiber reinforced plastic (found at http://www.bluebird-electric.net) show that carbon fibers are commonly manufactured by heating polyacrylonitrile, pitch, or rayon at temperatures ranging from 1500 °C up to 3000 °C, so it is clear that the melting point of carbon fibers is in the thousands of degrees C. This means that the heating temperature employed in Examples 2 and 3 of Kawaguchi is thousands of degrees below the melting point of the carbon fibrils.

Further evidence that Kawaguchi has no intention of melting the electroconductive fibrils when connecting printed circuit boards to each other is found in column 3, lines 40 - 48 which give examples of typical conductive fibers, including aluminum (melting point of 660° C), copper (melting point of 1083° C), tungsten (melting point of 3410° C), molybdenum (melting point of 2610° C), lead (melting point of 327° C), and magnesium (melting point of 650° C). Other examples given in Kawaguchi of conductive fibers likewise have melting points well above the typical heating temperatures given in the examples.

Therefore, when the film adhesive of Kawaguchi is used to join circuit boards to each other, the heating temperature is nowhere close to the melting point of the electroconductive fibrils in the film. Thus, there is no contemplation in Kawaguchi of heating a resin composition to a temperature which

is higher than the melting point of electrical conductive particles dispersed in the resin composition as set forth in claims 8 and 11.

Claims 8 and 11 both use the term "agglomeration" ("the electrically conductive particles collect between the opposing terminals by melting and agglomeration of the electrically conductive particles"). It is conjectured that the Official Action relied upon Kawaguchi because it refers to agglomeration of fibrils in column 5, line 58 ("the conductive fibrils 4 agglomerate to form an aggregate"). However, the process by which terminals are electrically connected to each other in Kawaguchi is totally different from the process described by claims 8 and 11. In the process of claims 8 and 11, heating is performed to above the melting point of electrically conductive particles, so the particles can melt and be metallically bonded to each other and to the terminals which the particles are to interconnect.

In contrast, in the process disclosed in Kawaguchi, the heating temperature never approaches anywhere close to the melting point of the fibrils. As a result, the fibrils are merely pressed into contact with each other and with the terminals which are to be interconnected without any bonding of the fibrils taking place. This is why in the process of Kawaguchi, pressure is applied to a polymeric material 3 not only while the polymeric material is being heated but also when the polymeric material is being cooled to cure the polymeric material. During heating, the pressure pushes the fibrils 4 into

physical contact with each other, while during the curing stage, the application of pressure is continued to maintain the fibrils 4 in contact with each other and with terminals of the printed circuit boards. The application of pressure can finally be terminated after the polymeric material has cured and adhesively bonded the printed circuit boards to each other. Thus, despite the use of the term "agglomerate", Kawaguchi bears no relationship to the method disclosed in claims 8 and 11.

It is important to remember that, as set forth in MPEP 2131, a claim is anticipated only if each and every limitation of the claim is found in a single prior art reference. The mere fact that a reference uses a term (such as "agglomerate") similar to one found in a claim is not a sufficient basis for an anticipation rejection.

Accordingly, since Kawaguchi does not disclose all the steps set forth in either of claims 8 and 11, it cannot anticipate these claims. Claim 8, claims 10 and 15 which depend from claim 8, claim 11, and claims 12 - 14 which depend from claim 11 are therefore allowable.

Claim 11 is further distinguished from Kawaguchi in that it includes interconnecting electrode pads of a semiconductor chip to circuit electrodes of a circuit substrate. Kawaguchi only describes connecting circuit boards to each other and contains no disclosure of connecting a semiconductor chip to a circuit substrate. Claim 11 is thus clearly not anticipated by Kawaguchi.

Claim 13 further patentably distinguishes the present

invention from Kawaguchi. Claim 13 states that during the heating of claim 12, substantially all of the electrically conductive particles in the resin composition collect in regions between opposing electrode pads and circuit electrodes. The Official Action states that Figures 1 and 2 of Kawaguchi illustrate this step, but there is no basis for such an assertion, since Kawaguchi does not disclose the location of terminals being interconnected, nor does Kawaguchi disclose that the embodiment shown in Figures 1 and 2 (in which the location of terminals is not disclosed) is the same as the embodiment shown in Figure 3 of Kawaguchi (in which fibrils 4 are shown located both atop and between terminals 5a, 5b, 5c). It is mere conjecture as to what would happen to the fibrils 4 located between terminals when heating takes place, and thus the assertion that claim 13 is anticipated is unsupported by the cited reference.

Figures 1 and 2 of Kawaguchi appear to show that when the polymeric material 3 is heated under pressure, the fibrils 4 not only move closer together in the vertical direction but also somehow move closer to each other in the horizontal direction, despite the fact that the polymeric material 3 itself is spreading laterally. However, Kawaguchi does not disclose any physical phenomenon which could account for this remarkable behavior of the fibrils 4 during heating. Somehow, the fibrils 4 are supposed to be able to travel horizontally like worms through the polymeric material 3 and form into a greater number of layers than existed before the start of heating (if Figure 2 is to be

believed, the original eight fibrils in Figure 1 have formed into nine layers of fibrils in Figure 2), even as the polymeric material 3 and the fibrils 4 are being compressed in the vertical direction to force the fibrils 4 into contact with each other. It can only be concluded that Figure 2 of Kawaguchi illustrates an imaginary state which does not exist in reality, and Kawaguchi cannot be relied upon for teaching any movement of the fibrils 4 except movement reducing the separation between fibrils 4 in the thickness direction of the polymeric material 3.

On page 5 of the Official Action, claim 9 was rejected under 35 USC 103(a) as unpatentable over Kawaguchi in view of Ouchi et al (JP 2002-343829, referred to below as Ouchi). This rejection is respectfully traversed.

The rejection of claim 9 is somewhat confusing because page 5 of the Official Action states that the basis of the rejection is Kawaguchi and Ouchi, while page 6 of the Official Action refers to "Segawa et al" several times. However, it is assumed that Segawa was mentioned by accident and that references to Segawa were meant to apply to Kawaguchi.

Kawaguchi was relied upon as supposedly teaching all the limitations of claim 9, while Ouchi was relied upon as teaching the use of a reducing resin. As best as can be determined, the Official Action is arguing that it would have been obvious to have modified Kawaguchi (referred to as Segawa et al on page 6 of the Official Action) to give the resin employed in Kawaguchi reducing properties.

Claim 9 depends from claim 8, which as stated above includes heating a resin composition to a temperature higher than the melting point of electrically conductive particles in the resin. As set forth above, Kawaguchi does not disclose such a step. Therefore, even if Kawaguchi were modified as proposed by the Official Action to employ a resin with reducing properties, the resulting method would still not disclose heating a resin composition to a temperature higher than the melting point of electrically conductive particles in the resin and so would not include all the steps set forth in claim 9 by its dependence from claim 8. As such, Kawaguchi and Ouchi cannot render claim 9 obvious. Claim 9 is therefore allowable.

New claims 15 - 21 describe additional features of the present invention. Claims 15 - 19 are allowable as depending from claim 8. New claim 20 describes a method of interconnecting terminals including heating a resin composition to a temperature which is higher than the melting point of the electrically conductive particles and at which the resin component is not completely cured. As set forth above with respect to claims 8 and 11, none of the cited references includes heating a resin composition to a temperature higher than the melting point of electrically conductive particles. Claim 20 and claim 21 which depends from it are therefore allowable.

In light of the foregoing remarks, it is believed that the

present application is in condition for allowance. Favorable consideration is respectfully requested.

Respectfully submitted,

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Attachment: "Carbon Fiber Reinforced Plastic"
(http://www.bluebird-electric.net)

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